

EX PARTE OR LATE FILED

DOCKET FILE COPY ORIGINAL

RECEIVED

MAR - 4 1993

SWIDLER & BERLIN

CHARTERED

3000 K STREET, N.W.

SUITE 300

WASHINGTON, D.C. 20007-3851

(202) 944-4300

March 4, 1993

HELEN E. DISENHAUS

ATTORNEY-AT-LAW

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

DIRECT DIAL

(202) 944-4725

TELEX: 701131

TELECOPIER: (202) 944-4296

VIA HAND DELIVERY

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C. 20554

Re: **Multichannel Communication Sciences, Inc.**
Ex Parte Notice in MM Docket No. 92-266

Dear Ms. Searcy:

On behalf of Multichannel Communication Sciences, Inc. ("MCSI"), pursuant to the ex parte requirements of Sections 1.1202, 1.1203 and 1.1206(a), 47 C.F.R. §§ 1.1202, 1.1203 and 1.1206(a), we hereby advise the Commission that ex parte presentations were made by MCSI on March 3, 1993, to members of the staffs of Commissioners Barrett and Duggan, certain members of the Common Carrier Bureau staff participating in the Commission's cable television regulation proceeding, and certain members of the staff of the Office of Engineering and Technology in connection with MM Docket No. 92-266. At the meetings, we discussed the Commission's proposed rules for regulation of cable television rates and, in particular, the factors to be considered in establishing a benchmark for determining the reasonableness of rates charged by a cable system operator for "cable programming service/tiers." MCSI provided the Commission staff with copies of the comments it had filed in MM Docket No. 92-266, and with the attached written ex parte presentation.

In particular, MCSI addressed Commission staff questions concerning the derivation of MCSI's proposed additional increment above the Commission's rate benchmark to be applied in assessing the reasonableness of tier rates charged by cable television system operators voluntarily electing to provide "cable programming service" tiers as Simultaneously Clear Addressable Tiered Services ("SCATS"). MCSI clarified that the calculation of the benchmark increment for the i th SCATS-provided tier (i.e., the value of d_i in MCSI's calculation formula), which would be added to the Commission's benchmark rate for non-SCATS tiers in evaluating the reasonableness of SCATS tier rates, was intended to parallel what MCSI conjectured to be the Commission's likely method of calculating the Commission's benchmark for evaluating the reasonableness of "cable programming service" tier rates.

No. of Copies rec'd
List A B C D E

0+5

MCSI tentatively assumed that the Commission would not find to be unreasonable the tier rates paid by 95% of the subscribers to "cable programming service" tiers (that is, the Commission would utilize a 5% percentile limit). MCSI's calculation of the additional benchmark increment for a SCATS-provided tier thus similarly assumed a 5% percentile limit. It thus set the value of the incremental quantity D on the basis of the value of the top 5% of cable operators' potentially displaced revenues from equipment rentals and additional outlet fees, calculated on a per basic cable subscriber basis.

MCSI's analysis of the per basic subscriber remote control rental and additional outlet fee revenue distribution data indicated that the dollar value of D (the national monthly total SCATS increment) is more than \$6. MCSI also explained that because the number of channels in all the Cable Programming Service tiers subscribed to by a given cable subscriber would be smaller than C (the national "characteristic" total number of "cable programming service" channels), in most cases on a per subscriber basis the sum of the d_i benchmark increments would be significantly smaller than the value of D . MCSI also noted that, in the event that a SCATS approach is not implemented, in order to comply with the "buy-through prohibition" provision of the 1992 Cable Act, cable operators would almost certainly adopt the option of scrambling "cable programming service" channels, requiring every subscriber to "cable programming service" tiers to use set-top converter descrambling devices, an option that would be more expensive for subscribers.

Any questions regarding this notice should be addressed to the undersigned.

Very truly yours,



Helen E. Disenhaus
Counsel for Multichannel
Communication Sciences, Inc.

Enclosure

cc (w/encl.): Robert E. Branson, Esq.
Amy J. Zoslov, Esq.
Kathleen Levitz, Esq.
Mr. Bruce A. Franca
Mr. Alan R. Stillwell
Mr. Douglas Webbink

EX PARTE OR LATE FILED

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION

MM DOCKET NO. 92-266

RECEIVED

MAR - 4 1993

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

MCSI'S BROADBAND DESCRAMBLING
AND PROPOSED REGULATORY BENCHMARK INCREMENTS
FOR VOLUNTARY OFFERING OF
SIMULTANEOUSLY CLEAR
ADDRESSABLE VIDEO PROGRAMMING SERVICES

Presented by
DR. RON D. KATZNELSON, PRESIDENT
MULTICHANNEL COMMUNICATION SCIENCES, INC.
MARCH 3, 1993

MCSI's BROADBAND DESCRAMBLING TECHNOLOGY, SUBSCRIBER EQUIPMENT COMPATIBILITY AND PROPOSED REGULATORY BENCHMARK INCREMENTS FOR SIMULTANEOUSLY CLEAR CATV SERVICE

1. CONSUMER ELECTRONICS EQUIPMENT COMPATIBILITY PROBLEM AND MCSI's SOLUTION.

- CATV ACCESS CONTROL STATUS AND TRENDS
- CONSUMER ELECTRONICS EQUIPMENT TRENDS
- MCSI's BROADBAND DESCRAMBLING AND ACCESS CONTROL TECHNOLOGY
- COMPARISONS WITH OTHER SOLUTIONS

2. SIMULTANEOUSLY CLEAR ADDRESSABLE VIDEO PROGRAMMING SERVICES.

- DEFINITION OF SIMULTANEOUSLY CLEAR ADDRESSABLE TIERED SERVICES ("SCATS")
- RESPONSIVE TO THE CABLE ACT OF 1992
- TANGIBLE BENEFITS TO SUBSCRIBERS
- CATV OPERATORS ISSUES

3. PROPOSED RATE BENCHMARK INCREMENT FOR SCATS.

- ESTABLISHMENT OF SCATS BENCHMARK INCREMENT FOR CABLE PROGRAMMING SERVICES
- MODIFICATION OF SCATS BENCHMARK INCREMENT FOR CABLE PROGRAMMING SERVICES
- FCC AUTHORITY

1. CONSUMER ELECTRONICS EQUIPMENT COMPATIBILITY PROBLEM AND MSCI'S SOLUTION

- CONSUMER ELECTRONICS TRENDS
- CATV ACCESS CONTROL STATUS AND TRENDS
 - SEVERAL PROVISIONS OF THE CABLE ACT OF 1992 WILL BRING CABLE OPERATORS TO TIERS. -- UNBUNDLING REQUIRES ACCESS CONTROL FOR EACH TIER.
 - MASSIVE SCRAMBLING OF EXPANDED BASIC TIERS; OR
 - GROUP TRAPS WITH LOSS OF UNBUNDLING FLEXIBILITY AND HIGH TIER CHANGE COSTS.
- MCSI'S ACCESS CONTROL TECHNOLOGY

ANNUAL U.S. COLOR TELEVISION SALES

Units (Million)

COPYRIGHT (C) 1992, MCSI

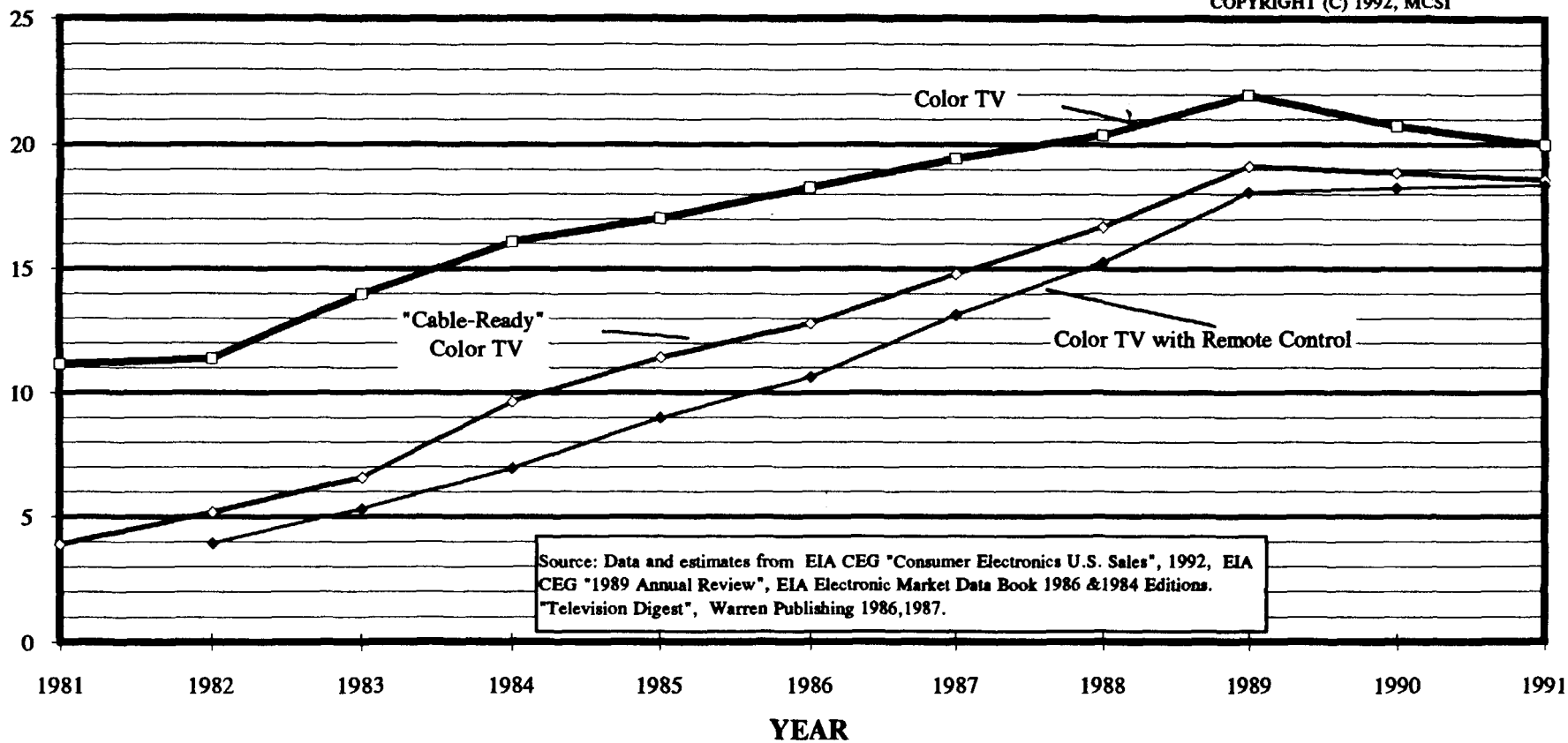


ILLUSTRATION # 1

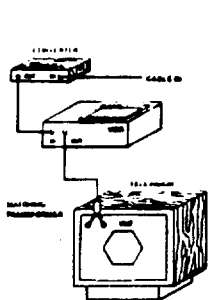


ILLUSTRATION # 2

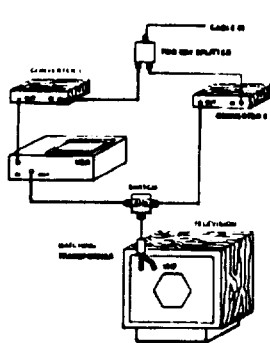


ILLUSTRATION # 3

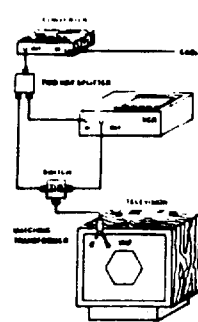


ILLUSTRATION # 4

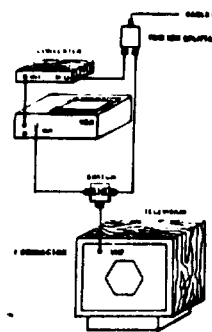


ILLUSTRATION # 5

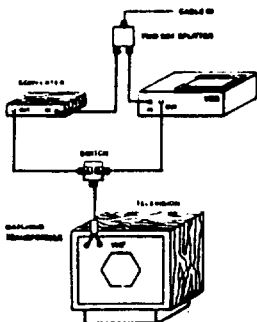


ILLUSTRATION # 6

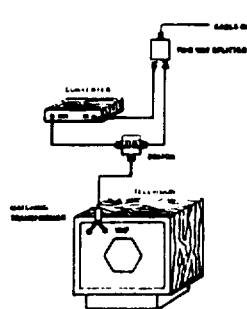


ILLUSTRATION # 11

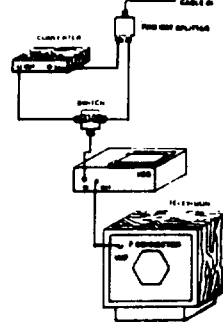


ILLUSTRATION # 12

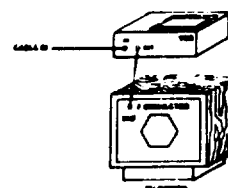


ILLUSTRATION # 13

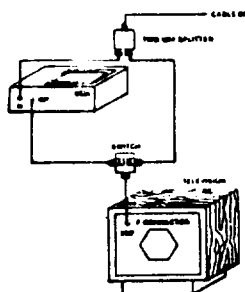


ILLUSTRATION # 14

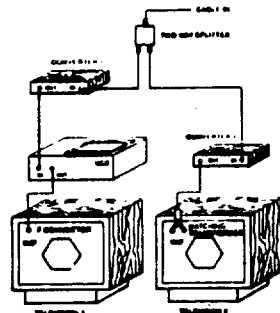


ILLUSTRATION # 19

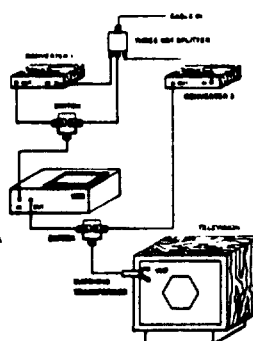


ILLUSTRATION # 20

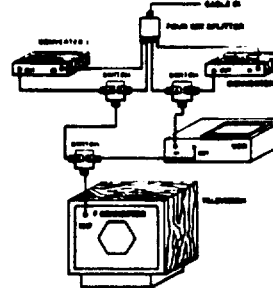


ILLUSTRATION # 21

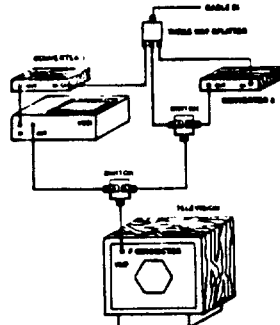


ILLUSTRATION # 22

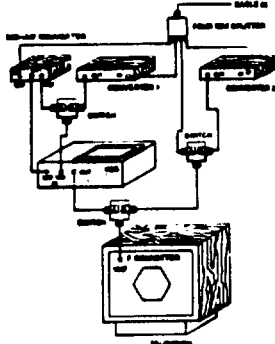


ILLUSTRATION # 23

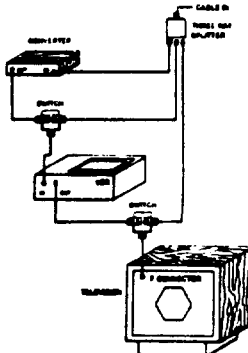


ILLUSTRATION # 24

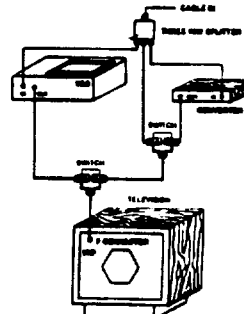


ILLUSTRATION # 27

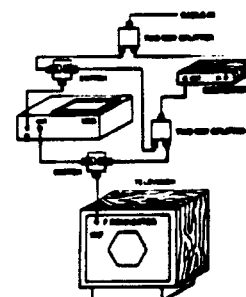
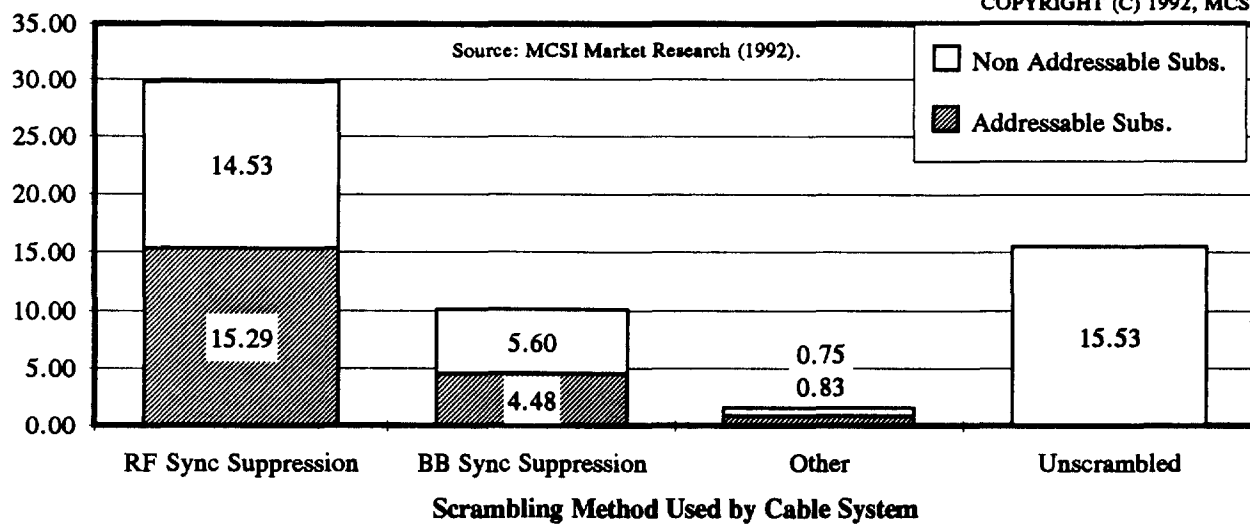


Figure 3. The Consumer Interface "Jungle". Subscriber: "Which hookup shall I use?"- Answer: "What Problems Are You Willing to Live with?".

of Subscribers
on Cable Systems
in Category (Millions)

INSTALLED BASE OF CATV ACCESS CONTROL TECHNOLOGIES

COPYRIGHT (C) 1992, MCSI



ADDITIONAL OUTLET USAGE BY CABLE SUBSCRIBERS WITH MULTIPLE TV SETS

% of CATV
Households

COPYRIGHT (C) 1992, MCSI

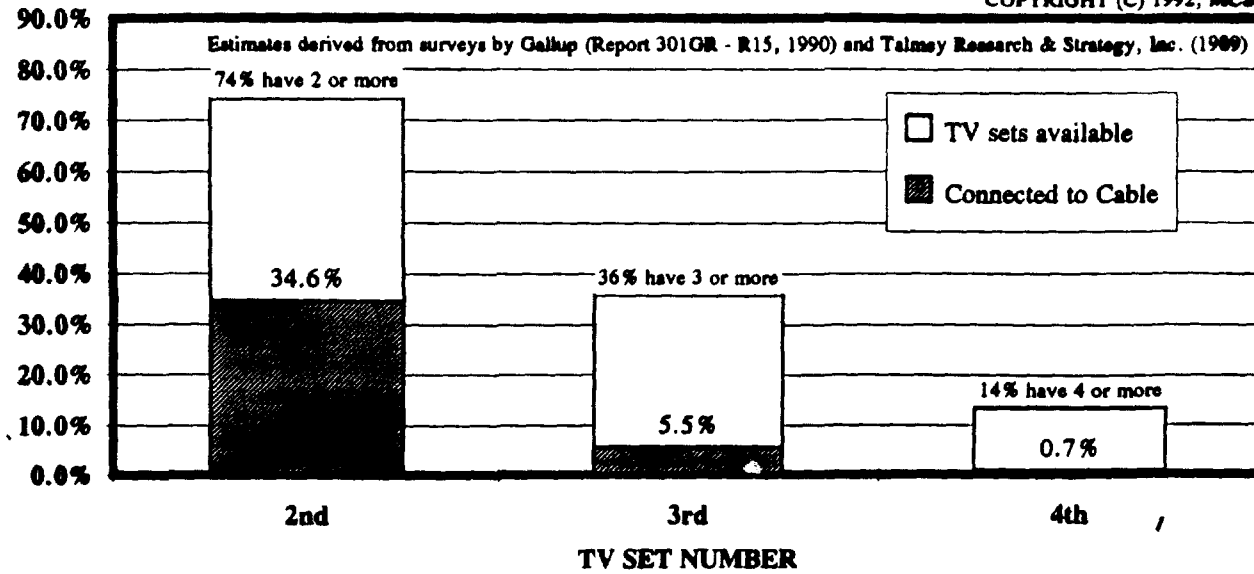


Figure 3.4. Additional Outlet Usage By Cable Subscribers who have at least two TV sets.

TELECOMMUNICATIONS

SPECIAL REPORT

Lost telecoms wired to the same source: Linkabit

pany spawned major
stry for San Diego

ADLEY J. FIKES

inding a new industry wasn't on the
of UCSD professors Irwin Jacobs
ndrew Viterbi in 1968 when they
l a part-time consulting firm called
it.

simply wanted to do work in the
evolving field of digital communica-

had just come out from MIT and
a lot of activity in the area," Jacobs

by most accounts, that two-man
ring firm was the catalyst for San
s burgeoning telecommunications
y, an industry that will produce an
ed \$700 million in revenues this

the past decade, Linkabit alumni
eated companies focusing on digi-
lar-telephone technology, high-
on TV, satellite- communications
ts, and worldwide personal-commu-
ns systems.

gether, 38 local companies working
communications employ about
eople, according to a 1992 survey
SD's Connect program. About
f these work for the 13 companies
d since 1980 by former Linkabit
ves.

total employment in the field esti-
o grow by about 19 percent a year,
munications promises to be one of
hts spots for the local economy.
look at how the industry started
Diego, what it has become and its
for the future.

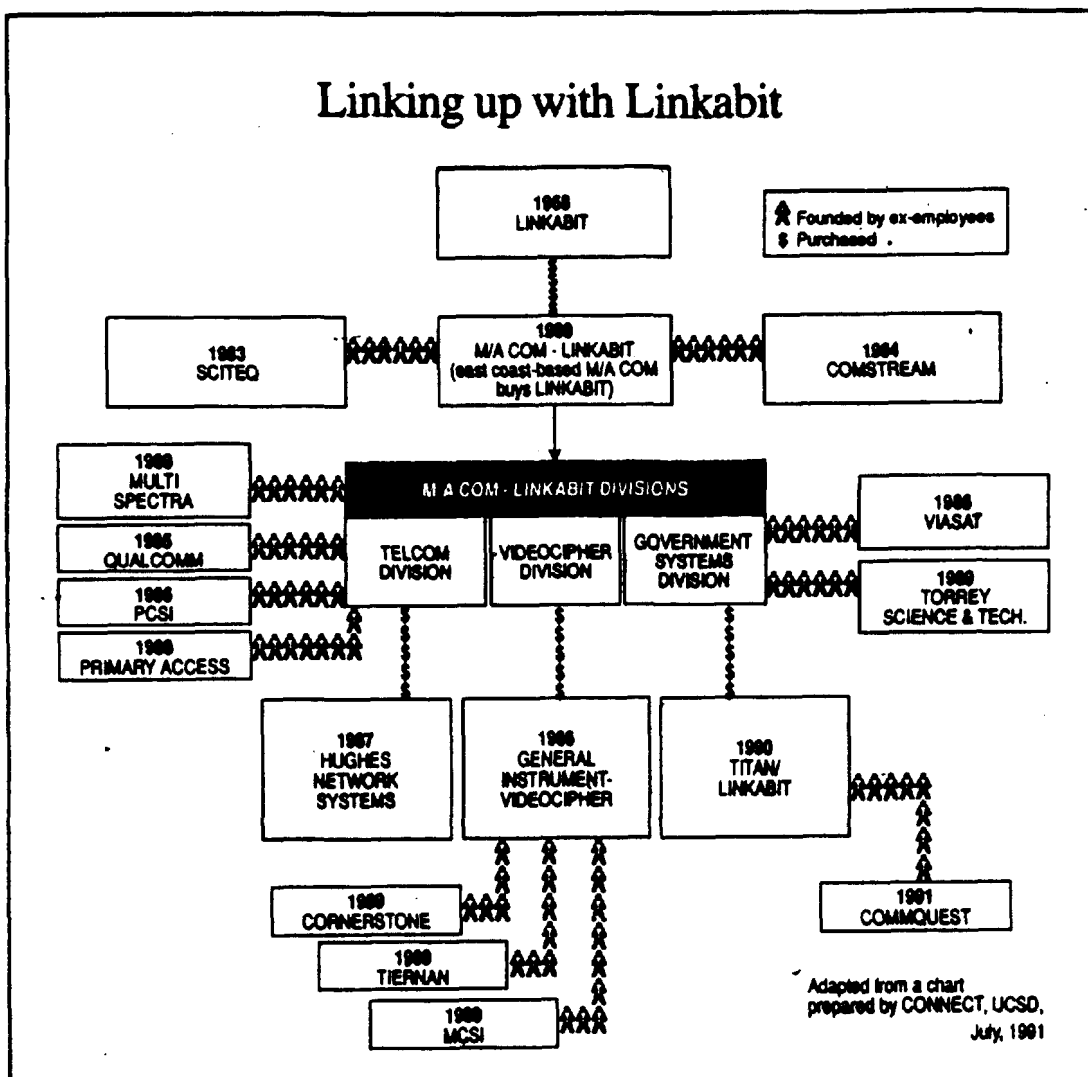
ial Linkup
bit was fortunate to be founded at
hen the uses for digital technology
st beginning to be explored, and
became increasingly fascinated

e mid-1970s, Linkabit designed a
r and a satellite-communications
l made for the military, which are
se today. These were typical prod-
r the company in its early days,
ilitary and government contracts
most of its business.

fledgling engineering company
etting more work than it expected,
said. In 1972, he and Viterbi left
for a full-time job at Linkabit,
apidly began hiring people.

d Heller was among the first on
He began developing a signal-
ing device for the public safety
phone Box Office. The work was
nt because it helped Linkabit
commercial sales and lessen its
ncy on the military.

Linking up with Linkabit



Diversification

The year 1980 was a milestone for Linkabit. The company was sold to an East Coast giant communications firm called M/A COM, and it was split into three divisions.

• The Government Systems division carried on Linkabit's traditional business. It later was sold to the Titan Corp.

• The VideoCipher division focused on television signal scrambling technology, and was the direct ancestor of the present-day company VideoCipher.

• The Telecom division was formed to develop other forms of digital telecommunications technology. This was the division Jacobs and others left in 1985 to

form Qualcomm.

That shift to the private sector made the company a more exciting place to work, recalled Martha Dennis, vice president of engineering and a founder of Pacific Communication Sciences Inc.

Linkabit became a fast, agile competitor that hired bright people, many of them from the Massachusetts Institute of Technology, and gave them jobs worthy of their education.

"Things were moving so quickly in engineering that two years at Linkabit were the equivalent of five or six years in a typical engineering company," Dennis said.

Perhaps more importantly, she added,

"It gave all these young engineers a framework in which to go off and start their own companies."

On Their Own

That spin-off pattern started in the early 1980s, when M/A COM de-emphasized some of the non-government programs at Linkabit, Jacobs said. This concerned the senior engineers, who saw great opportunities apparently being neglected.

Beginning in 1983, these technical experts turned into entrepreneurs, and founded the following companies:

Seiteq Electronics, Inc.: Founded in 1983, Siteq makes microwave communication systems and components. It also

Please turn to page 18

MCSI

**The MCSI Digital Broadband
Descrambler / Access-Control
Technology**

**MULTICHANNEL COMMUNICATION
SCIENCES, INC.**

3550 Dunhill Street, San Diego, CA 92121
Tel: (619) 597-4004; Fax: (619) 452-3841

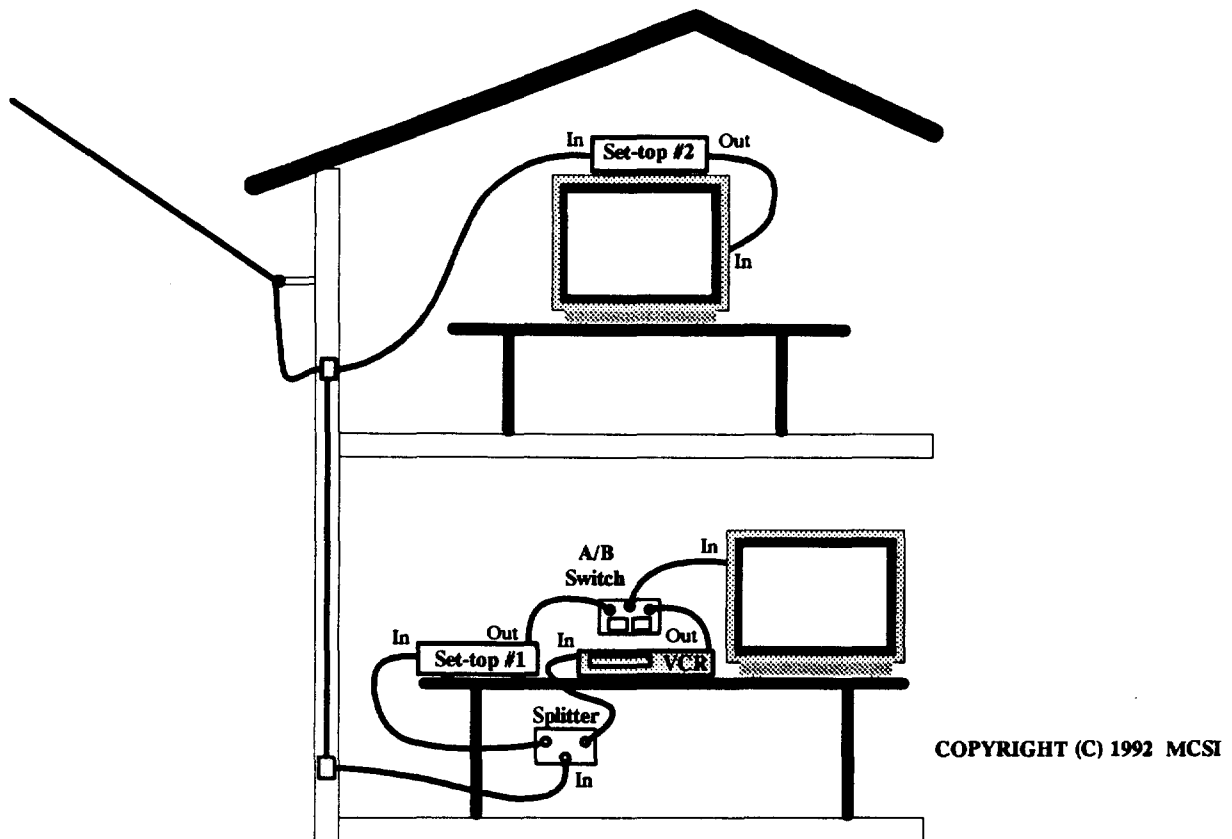


Figure 1 (a). Typical cable hook-up with conventional set-top descramblers

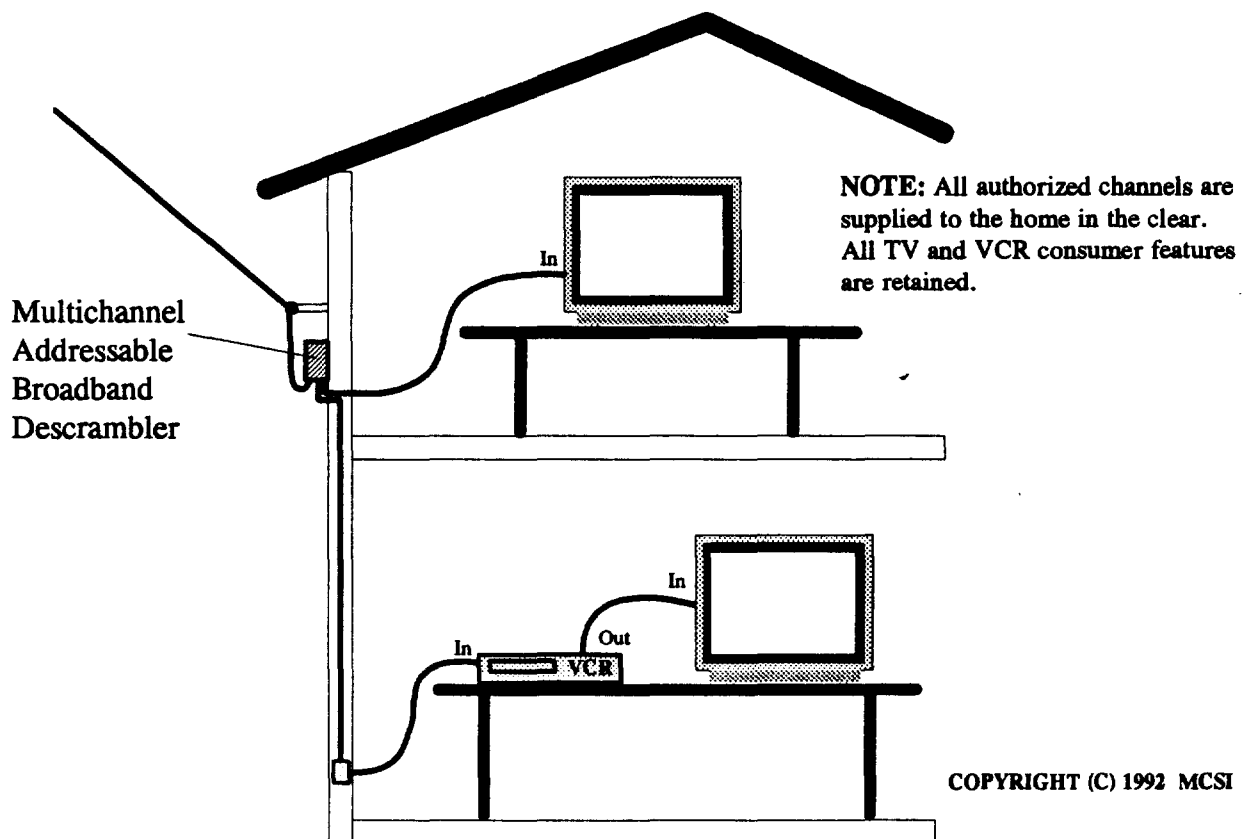


Figure 1 (b). Cable hook-up with Point of Entry multichannel Broadband Descrambler

BROADBAND DESCRAMBLER OPERATION - EXAMPLE -

Service Tiers Offered by a Cable System:

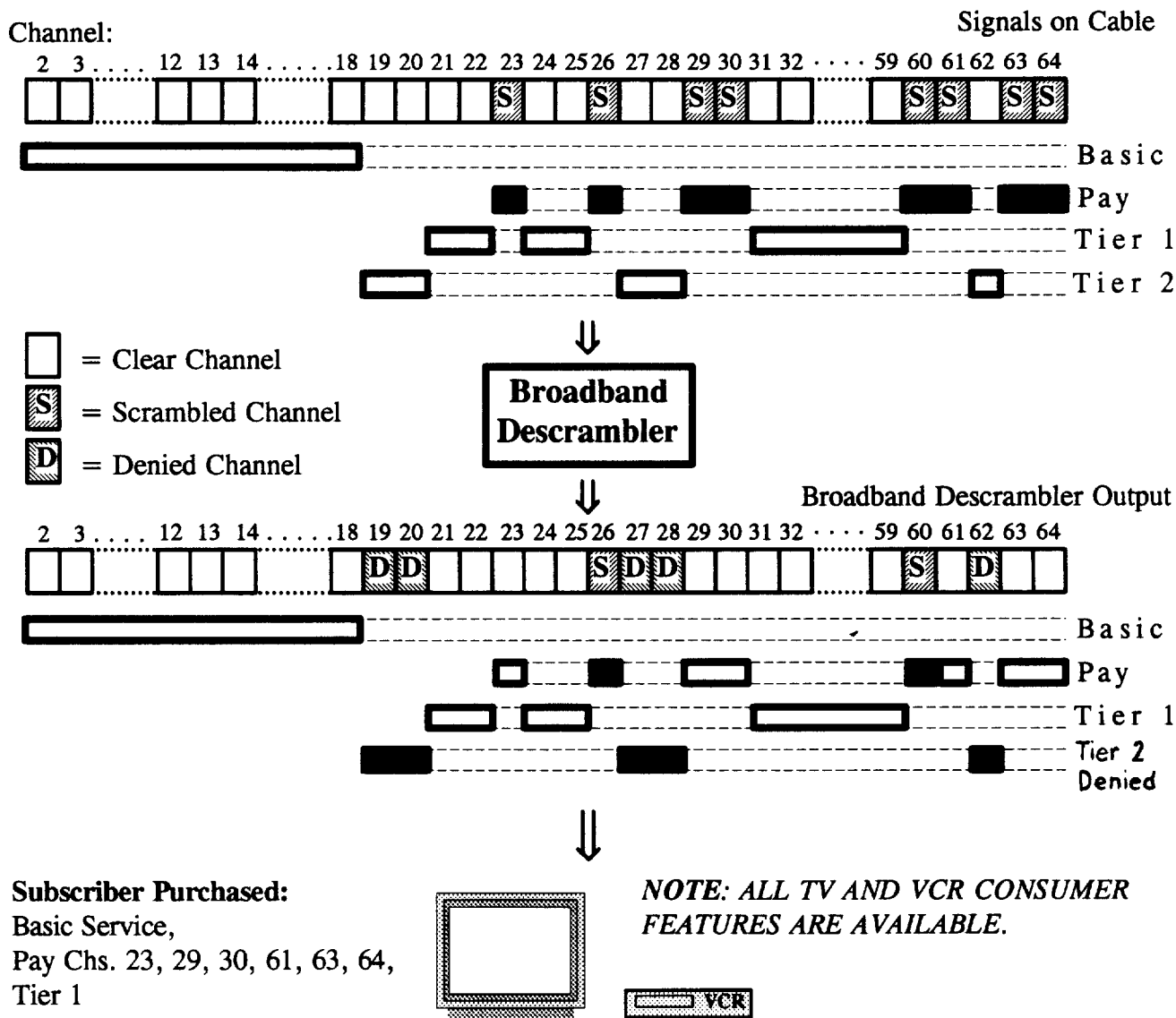
Basic Service: Chs. 2 - 18

Pay Services: Chs. 23, 26, 29, 30, 60, 61, 63, 64

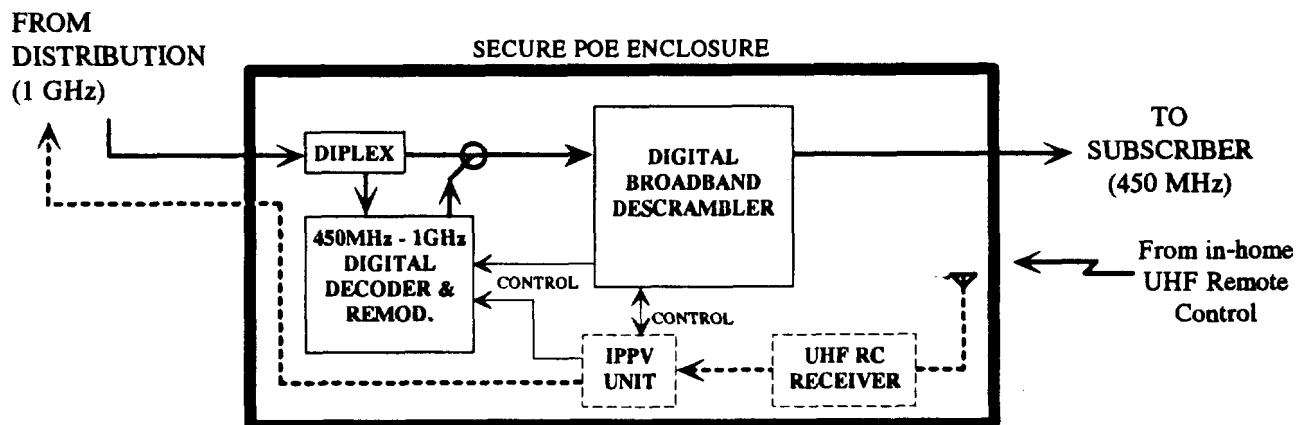
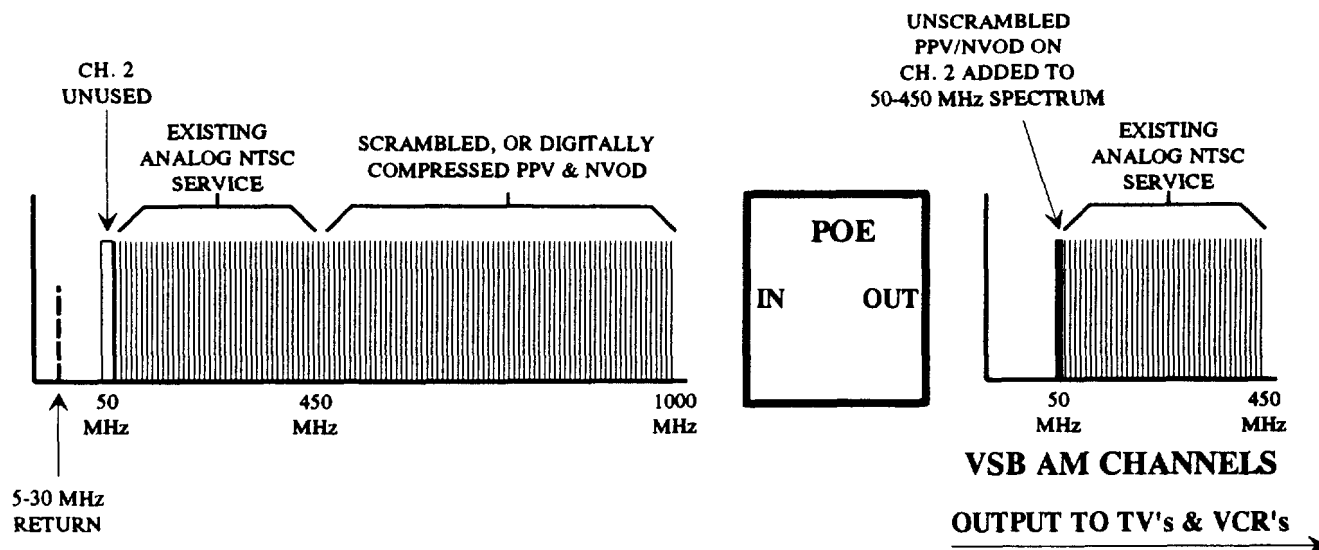
Cable Programming Services:

Tier 1: Chs. 21, 22, 24, 25, 31 - 59

Tier 2: Chs. 19, 20, 27, 28, 62



Point Of Entry Input & Output Frequency Spectrum



MCSI

DIGITAL BROADBAND DESCRAMBLER / ACCESS-CONTROL ADVANTAGES

OPERATIONAL

- * NO INDOOR ELECTRONICS. NO CONVERTER CHURN COSTS. NO MISSED APPOINTMENTS OR OTHER SUBSCRIBER INTERACTION COSTS.**
- * BACKWARD COMPATIBLE WITH EXISTING SCRAMBLING SYSTEMS.**
- * ALLOWS GRACEFUL AND CONTROLLED MIGRATION FROM INDOOR DESCRAMBLING TO OPD IN ALL OR SELECTED AREAS OF THE CATV SYSTEM.**
- * PROVIDES ADDITIONAL OPD SECURITY IN INSTALLED SUBSCRIBER LOCATIONS. (FURTHER VIDEO DENIAL OR AUDIO DENIAL).**
- * PROVIDES FOR UPGRADE TO ENCRYPTION BASED ENHANCED SECURITY SCRAMBLING SYSTEM.**
- * PROVIDES SUBSCRIBER FRIENDLY DISCONNECTS WITH OSD MESSAGE REPLACEMENT. (WITH OSD OPTION).**

SUBSCRIBER FRIENDLY

- * EASY INTERFACE FOR CABLE-READY SETS, SECOND SET, VCR'S ETC.**
- * ALLOWS SUBSCRIBER SIMPLE TIME-SHIFT PRACTICES FOR ALL CHANNELS.**
- * ENHANCES LIVING ROOM ESTHETICS BY REMOVING THE SETOP BOX AND ITS WIRING.**

TECHNICAL

- * NO DEGRADATION OF THE VIDEO OR AUDIO PORTION OF THE SIGNAL- NO FILTERING OR REMODULATION.**
- * MTS PASS THROUGH WITHOUT DEGRADATION OR BUZZ**
- * PROVIDES END POINT STATUS MONITORING: SIGNAL LEVELS AT SUBSCRIBER DROPS. (WITH OSD OR REPORT-BACK OPTIONS).**
- * ALLOWS FUTURE RECLAIMING OF THE FULL VIDEO LINE INCLUDING OVERSCAN.**

2. SIMULTANEOUSLY CLEAR ADDRESSABLE VIDEO PROGRAMMING SERVICES

- DEFINITION: A PROGRAMMING SERVICE TIER IS DEFINED AS *SIMULTANEOUSLY CLEAR ADDRESSABLE TIERED SERVICE* ("SCATS") IF ALL VIDEO CHANNELS CONTAINED THEREIN ARE PROVIDED SIMULTANEOUSLY IN THE CLEAR (IN UNSCRAMBLED FORM) TO SUBSCRIBERS THERETO, EXCEPT THAT NO BUY-THROUGH OF SCATS SHALL BE REQUIRED IN ORDER TO PURCHASE ANY OTHER PROGRAMMING SERVICE TIER.
- THE PROVISION OF SIMULTANEOUSLY CLEAR ADDRESSABLE VIDEO PROGRAMMING SERVICES IN GENERAL, AND ANY SCATS IN PARTICULAR, IS RESPONSIVE TO THE CABLE ACT OF 1992:
 - CONSUMER ELECTRONICS EQUIPMENT COMPATIBILITY (SECTION 17 OF THE ACT) INCREASED COMPETITION FOR SUBSCRIBER EQUIPMENT
 - TIER BUY-THROUGH PROHIBITION (SECTION 3(a) OF THE ACT)
 - OTHER PROVISIONS
 - SECTIONS 4 - 6: SIGNAL CARRIAGE
 - SECTION 10(b): BLOCKAGE OF INDECENT PROGRAMMING

- TANGIBLE BENEFITS OF SCATS TO SUBSCRIBERS
 - CONSUMER ELECTRONICS COMPATIBILITY
 - SUBSCRIBER EQUIPMENT RENTAL SAVINGS
 - POWER SAVINGS:
 $10 \text{ WATT} \times 24 \text{ HOURS} \times 30 \text{ DAYS} = 7.2 \text{ KW HOURS/MO} = \$0.72/\text{MONTH}$
 - HOME WIRING SAVINGS:
 WIRES, SPLITTERS & A/B SWITCHES = \$10
 - TIER CHANGE FEE SAVINGS:
 \$15 - \$30 PER TIER CHANGE
 - PAY ONLY FOR DESIRED TIER (NO BUY-THROUGH)
- CATV OPERATORS' ISSUES TO BE ADDRESSED
 - EQUIPMENT CAPITAL INVESTMENT
 - MAY EXPERIENCE REDUCED REVENUES FROM SUBSCRIBER EQUIPMENT RENTAL AND MONTHLY FEES FOR ADDITIONAL OUTLETS
 - MAY INCUR INCREMENTAL SALES AND MARKETING EXPENSES FOR TIER-SPECIFIC PROMOTIONS DUE TO THE LACK OF BUY-THROUGH INDUCEMENTS

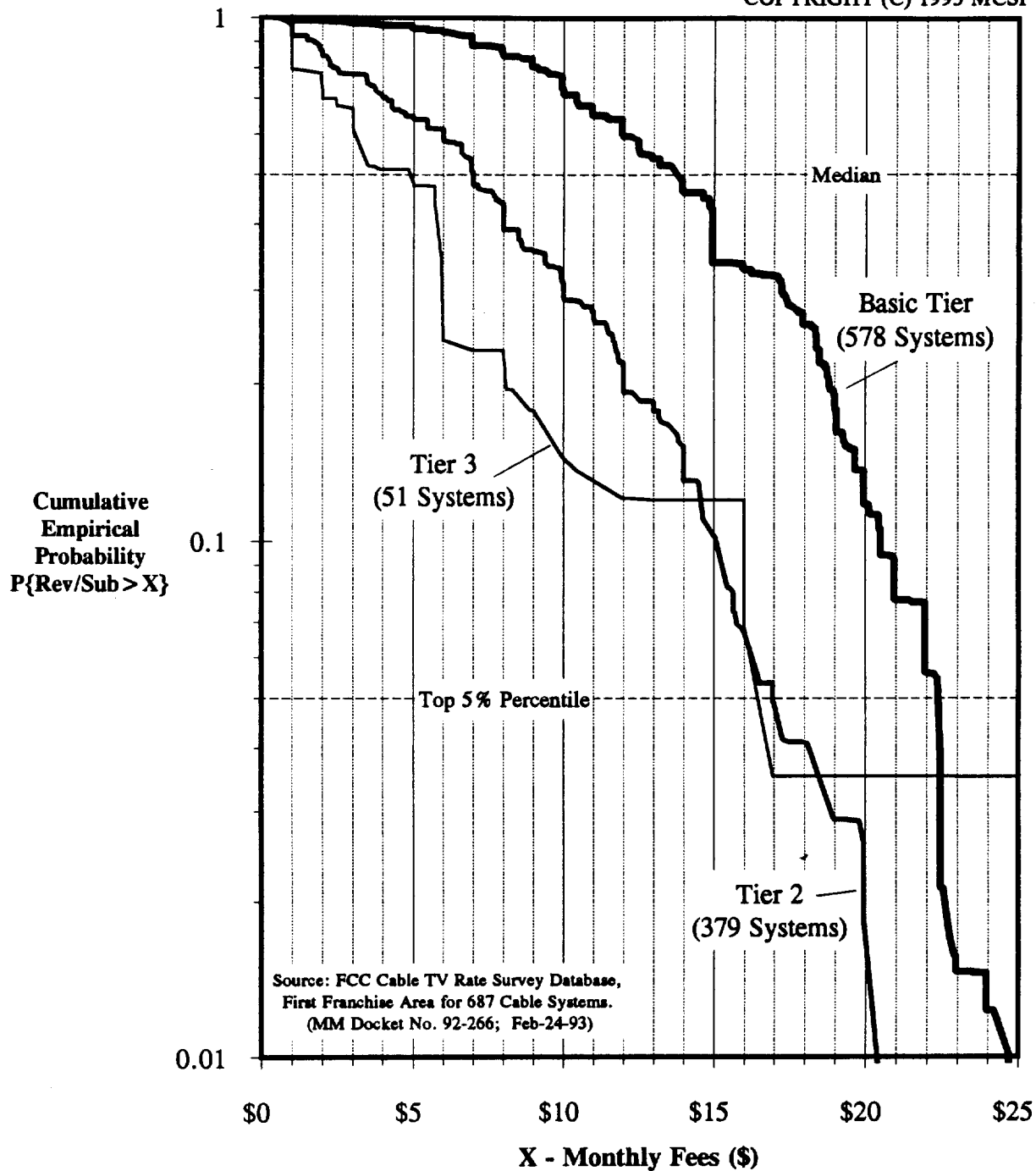
3. PROPOSED RATE BENCHMARK INCREMENTS FOR VOLUNTARY "SCATS" OFFERING

- ESTABLISHMENT OF SCATS BENCHMARK INCREMENTS FOR CABLE PROGRAMMING SERVICES
 - DEFINE QUALIFIED "SCATS":
 - ALL "SCATSs" MUST BE SIMULTANEOUSLY SUPPLIED AT THE SUBSCRIBER TERMINAL
 - TOTAL NUMBER OF CHANNELS IN QUALIFIED "SCATSs" MUST BE AT LEAST FOUR (4)
 - ESTABLISH A NATIONAL SCATS INCREMENT OF D DOLLARS PER MONTH (*e.g.*, \$6/MONTH) AND A NATIONAL "CHARACTERISTIC" TOTAL NUMBER OF CABLE PROGRAMMING SERVICES C
 - FORM THE BENCHMARK INCREMENT GIVEN BY
$$d_i = Ch_i \times (D/C)$$
FOR TIER i WITH Ch_i CHANNELS OFFERED AS SCATS
 - USE d_i TO INCREMENT WHATEVER (PER-CHANNEL) BENCHMARK THE FCC ESTABLISHES FOR CABLE PROGRAMMING SERVICES NOT OFFERED AS SCATS

- MODIFICATION OF SCATS BENCHMARK INCREMENT FOR PROGRAMMING SERVICES
 - THE NATIONAL CHARACTERISTIC SCATS INCREMENT (*D/C*) SHOULD BE "SNAPSHOT" IN 1993 AND ALLOWED TO INCREASE OVER TIME BY YEARLY UPDATES BASED ON RELEVANT COST INDICES THE FCC SELECTS SUCH AS CPI OR PPI ETC.
 - WHEN SUFFICIENT DATA IS AVAILABLE FROM SYSTEMS OFFERING SCATS IN THE FACE OF "EFFECTIVE COMPETITION" (HENCE UNREGULATED AND FREELY SETTING MARKET RATES FOR SUCH SCATS OFFERING), (*D/C*) FOR REGULATED SYSTEMS MAY BE SET OR MODIFIED BY THE FCC ACCORDING TO SUCH METHODS AS THE FCC ESTABLISHES FOR FACTORING SUCH INFORMATION IN SETTING OTHER BENCHMARKS FOR CABLE PROGRAMMING SERVICES
- FCC AUTHORITY AND RESPONSIBILITY
 - THE OFFERING OF SCATS BY CABLE OPERATORS MUST BE VOLUNTARY. MANDATING SCATS WOULD NOT BE IN THE PUBLIC INTEREST.
 - THE COMMISSION NEED NOT ARRIVE AT A FINDING THAT TECHNOLOGIES FOR IMPLEMENTING SCATS ARE EITHER AVAILABLE OR COST-EFFECTIVE IN ORDER TO PROCEED WITH THE IMPLEMENTATION OF INCREMENTAL BENCHMARKS FOR THE VOLUNTARY OFFERING OF SCATS. THE EXISTENCE OF SUCH INCENTIVES PROVIDES THE BEST ASSURANCE FOR SCATS TECHNOLOGIES TO BE PERFECTED AND BROUGHT TO MARKET.

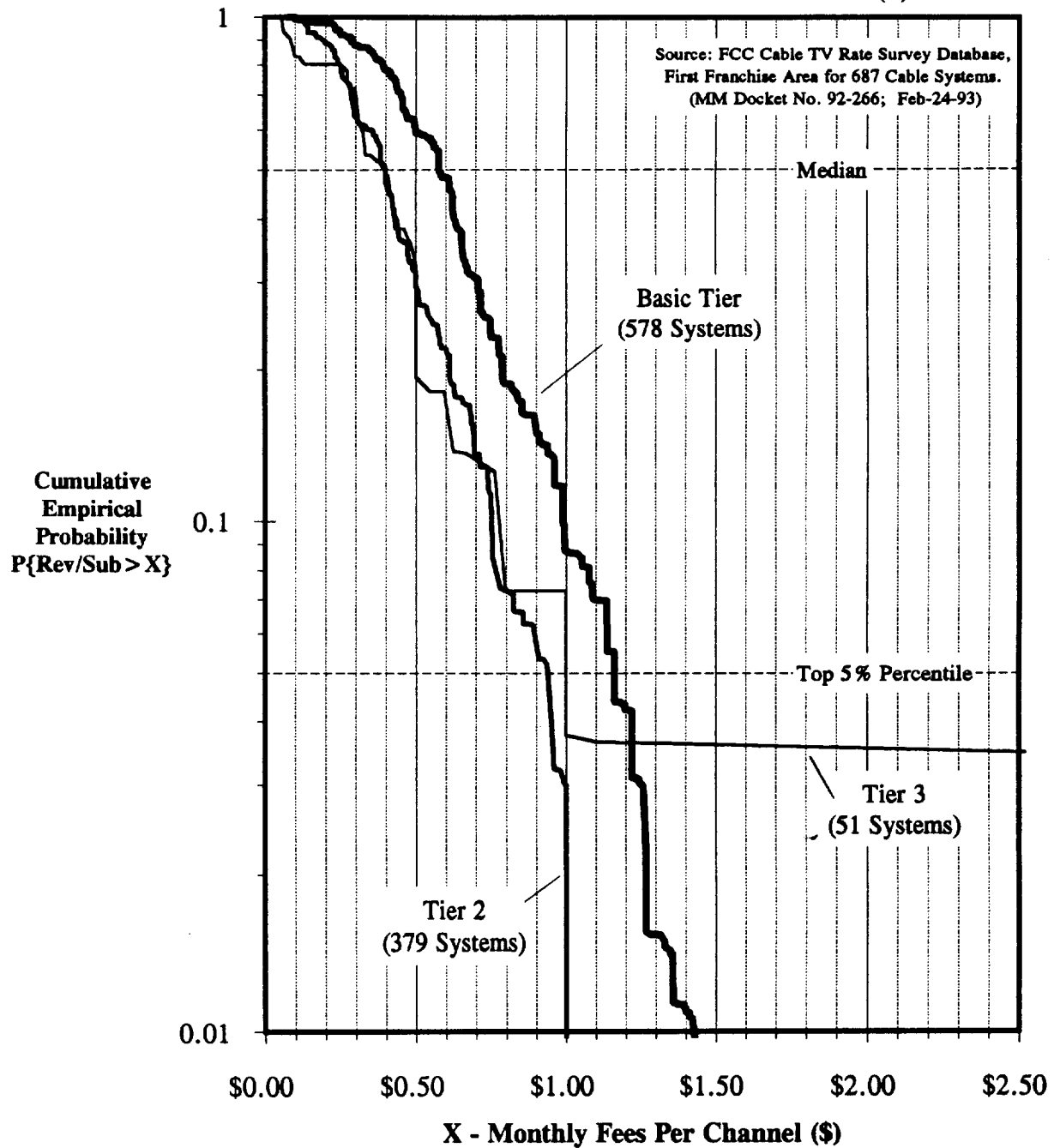
DISTRIBUTION OF MONTHLY TIER FEES

COPYRIGHT (C) 1993 MCSI



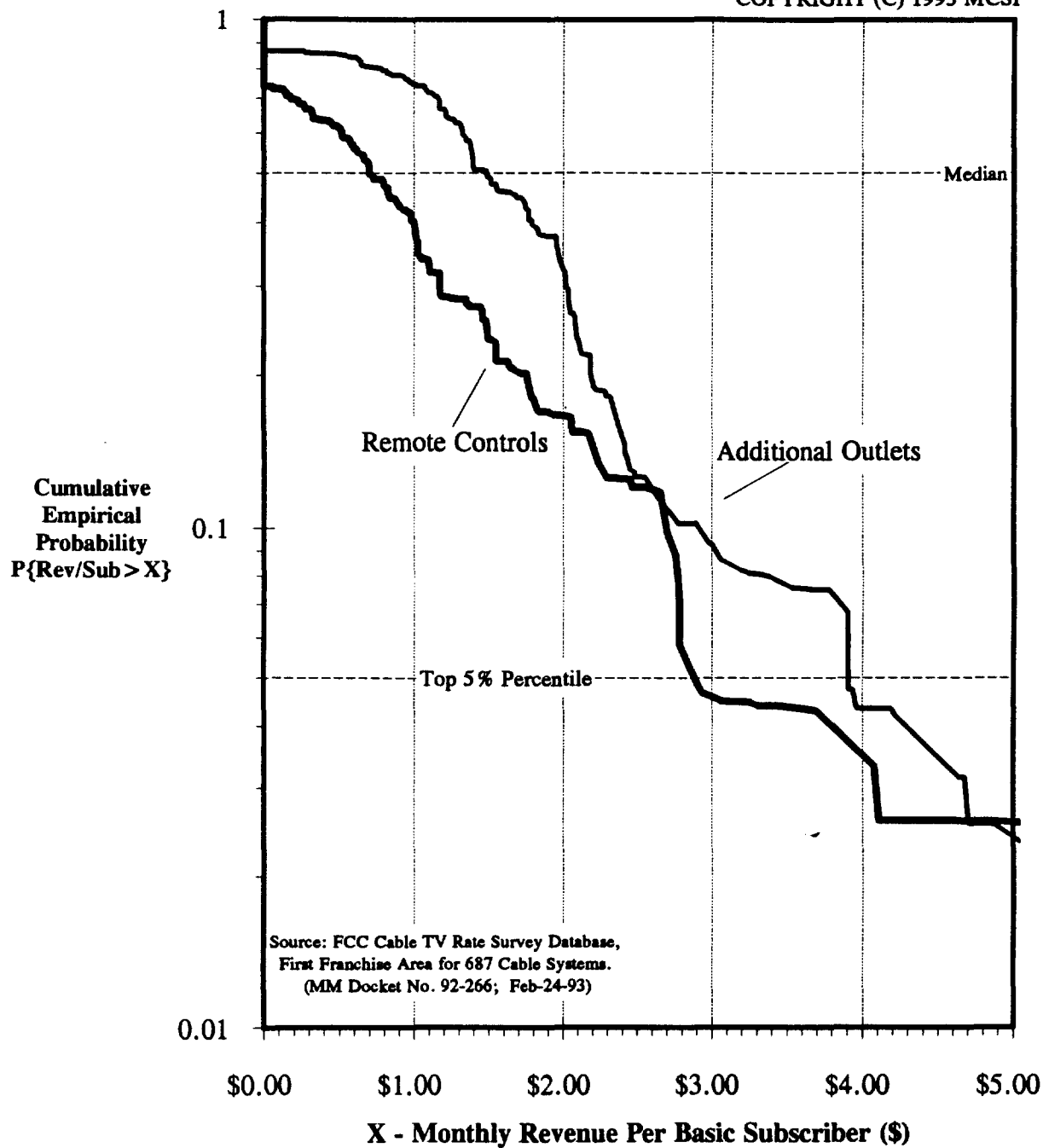
DISTRIBUTION OF MONTHLY TIER FEES PER CHANNEL

COPYRIGHT (C) 1993 MCSI



DISTRIBUTION OF MONTHLY REVENUES PER BASIC SUBSCRIBER

COPYRIGHT (C) 1993 MCSI



3 Remotes and Converter? Here Comes Relief

By JAMES BARRON

Sometime in 1984 or 1985, zapper-wielding couch potatoes who now have multiple remote controls should be able to throw away all but one of them, no longer needing one for the television set, another for the videocassette recorder and a third for the cable converter.

In fact, they may no longer need a converter. The remote-control devices that come with the VCR should change the channels on the television, and the remote control for the television should change the channels on the VCR. And the television will probably unscramble scrambled cable channels.

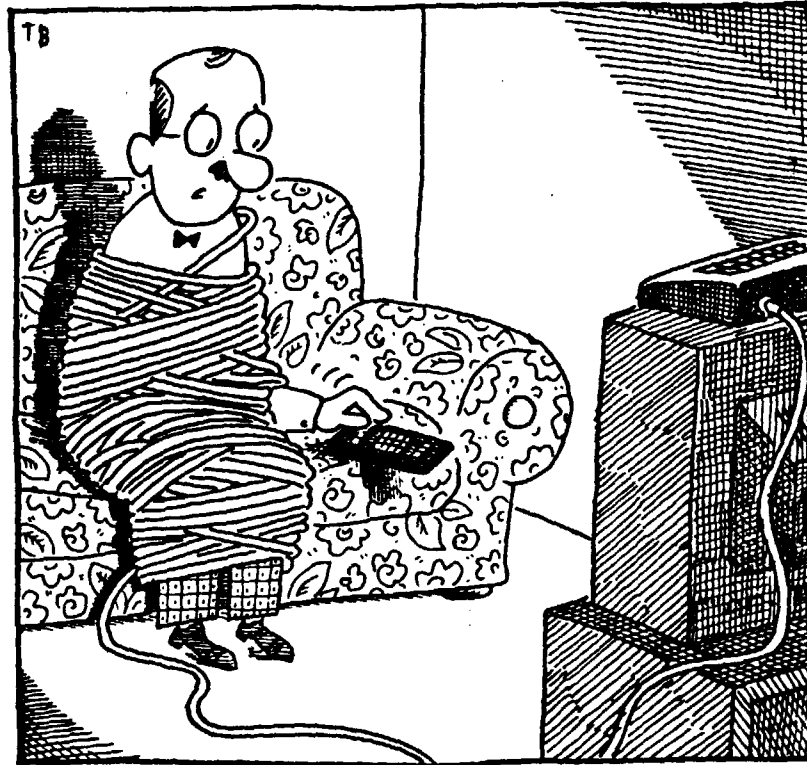
How and why these breakthroughs are expected to occur says a great deal about the uncoordinated development of technology. They will result not from discoveries by white-coated scientists tinkering with advanced circuitry, but from the Federal cable-television law passed in October.

'It's a Win-Win'

The new law gives the Federal Communications Commission until October 1993 to investigate ways to make televisions, videocassette recorders and cable systems compatible. By January 1994, the F.C.C. must issue regulations to guarantee compatibility.

Like technology in general, cable hardware seems to be evolving faster than ever. So it remains to be seen precisely what the forthcoming regulations may mean in terms of new equipment that will end up in viewers' homes.

"It's a win-win for cable companies and equipment manufacturers and consumers, if it works," said Bill Johnson, the deputy chief of the F.C.C.'s mass-media bureau, speaking of the new compatibility.



Tom Bloom

"I thought this would be something that would make everyone happy," Mr. Johnson continued. "But we don't want to standardize something that's about to be obsolete. We're trying to make it for systems we have now, and not retard television development."

The regulations will also cover the circumstances under which cable systems can scramble their signals in cases where scrambling keeps television sets and VCR's from operating together. There will also be a kind of truth-in-labeling provision: the F.C.C. is to specify technical requirements for selling television sets and videocassette recorders as "cable ready."

The idea is to let cable customers plug the cable into their sets, turn them on and do everything with a single remote control, from switching channels to cutting commercials. If they want to watch one channel while they tape another, they will never again have to leave the couch to fiddle with the converter.

Why did Congress intervene? "Cable industries and consumer electronics had been working in different areas," said Cynthia Upson, a spokeswoman for the Electronic Industries Association. "This was more a way of speeding up the process."

Since the first cable lines were

strung up, subscribers have needed converters, small boxes provided by the cable company that usually sit near — or on top of — the television set. Turning the knob or punching the buttons changes stations. The channel selector on the television itself remains tuned to the one channel, often Channel 3, that is wired for input from the converter.

Cable-ready television sets were designed to do away with the box, to let viewers change channels right on the set or with remote-control devices. More than 20 million cable-ready sets have been sold each year since 1987, according to the Electronic Industries Association, a trade group for television manufacturers.

The brouhaha over cross-compatibility began in the mid-1980's, when cable systems started scrambling some or all of their channels in an effort to prevent nonpaying viewers from pirating their programs. The extent of cable pirating is a matter of some debate in the industry. Some cable-company officials say that one in five cable hookups in New York City is illegal.

But as cable systems began scrambling signals, owners of cable-ready television sets and VCR's discovered that their gadgets no longer functioned as promised. Scrambling made it impossible to watch one channel while taping another (without multiple converter boxes) or to program the VCR to change channels for unattended taping of programs on different channels. (Channels must be changed manually through the converter box.)

Will the cable-law requirements eliminate converters and multiple remote controls? Will changing channels become as easy as punching just one button? As they say on television, stay tuned.

RON D. KATZNELSON, Ph.D.
PRESIDENT and CHIEF SCIENTIST, MCSI

Dr. Katznelson is a co-founder of Multichannel Communication Sciences, Inc. ("MCSI"). He has over 20 years of experience in communication systems and electronics related technologies. Prior to founding MCSI in 1989, Dr. Katznelson was with the VideoCipher Division of General Instrument Corporation ("GIC") where he served as Director, New Technology Development. In this capacity, Dr. Katznelson directed several R&D projects in the areas of Advanced Television Systems, Enhanced Security Cryptographic Systems and satellite and terrestrial based Video Encryption Systems. In 1988, he negotiated and helped set up the Japan VideoCipher Corporation - a joint venture between GIC, C. Itoh and Toshiba Corporation. In early 1987, Dr. Katznelson initiated and directed GIC's Anti-piracy Electronic Counter Measure campaign against pirates of the VideoCipher II system.

Dr. Katznelson joined GIC as part of the acquisition of the VideoCipher Division from M/A-COM Linkabit in 1986 by GIC. In his three prior years at Linkabit, Dr. Katznelson worked on design and development of various satellite communications systems, and later on the development of the VideoCipher II system, and served as the System Engineer for the terrestrial version of the VideoCipher system. While at Linkabit, as an Engineering Manager, Dr. Katznelson had considerable experience in development projects and engineering management.

Prior to his position at M/A-COM Linkabit, Dr. Katznelson was a full time Assistant Professor of Electrical Engineering at the University of California, San Diego (UCSD). At UCSD, he was engaged in research in Signal Design for Parameter Estimation and Signal Detection Theory as well as teaching electrical engineering courses.

Dr. Katznelson received a dual Bachelor of Science degree in Mathematics and Physics and the M.Sc. degree in Solid State Physics in 1975 and 1977 respectively, both from the Hebrew University in Jerusalem, Israel. He received his Ph.D. degree in Electrical Engineering (Communication Theory and Systems) from the University of California, San Diego in 1981. He has co-authored a book and authored numerous technical publications in areas including semiconductor device physics, signal processing, satellite television transmission techniques, and HDTV/EDTV transmission systems. Dr. Katznelson holds numerous patents and patent applications in the areas of television encryption, digital audio compression and transmission, video processing, CD-ROM encryption, HDTV systems, and multicarrier fiberoptic transmission systems.

Ron Katznelson is a licensed Amateur Radio operator since 1967, and a licensed private pilot since 1979.